ENZYME ACTIVITY INVOLVED IN N AND P CYCLES, OF SOYBEAN PLANT RHIZOSPHERE SOIL, ROOTS AND LEAVES

Oxana DARABAN[1], Iana BIZGAN [1], Ecaterina EMNOVA[1], Simion TOMA[1]

e-mail: kateemnova@mail.ru

Abstract

The research aim was to evaluate the influence of exogenous nitrogen sources on key-enzyme activity involved in nitrogen (urease) and phosphorus (phosphatase) metabolism in the rhizosphere soil, roots and leaves of soybean plants at bud-flowering stage. The field experiment was designed on 4 plots (12 m^2, 60 plants/ m^2): two fertilization treatments x four replicates. The soil was fertilized in starting rates with mineral forms of N and P ($N_{20}P_{60}$): KH_2PO_4; NH_4NO_3 (ammonium nitrate) and $(NH_2)_2CO$ (urea). Urease and phosphatase activity (acid, alkaline and total) were determined in the studied material. Application of additional sources of mobile nitrogen (N) led to changes of enzymatic activities determined in the rhizosphere soil and soybean plant organs. Urease activity showed an increase in soil treated with urea, which probably served as a substrate for increased ammoniacal nitrogen amount and uptake, respectively. The increasing of the phosphatase activity in the rhizosphere soil and roots, in the treatment with ammonium nitrate as soil fertilizer, showed an intensification of the phosphorus mobilization. The obtained data indicated that there was an increased need in phosphorus assimilation for plants, in this treatment. Phosphatase activity (acid and total) in leaves was not influenced by the type of applicated fertilizer. Cultivation of soybean plants on soil fertilized with urea led to increased productivity elements compared to ammonium nitrate. Experimentally, it has been argued, the significant role of nitrogen sources in achieving mechanisms of functional integration and optimization of relations between roots and rhizosphere processes driven by microorganisms, thus, contributing to increase the productivity potential of soybean plants.

Key words: soybean plants, ammonium nitrate, urea, urease activity, phosphatase activity